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DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
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GENERAL NOTE

Owing to the current nature of the investigations mentioned in the Technical News Bulletin, sometimes it will be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the Bureau will be pleased to furnish technical data to those engaged in the particular application of the subject, in order to avoid the delay incident to publication.

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1 Tests of High Speed Steels

The work which the Bureau is conducting on high speed steels was briefly described in Item 13, Bulletin 79. Progress was made during the past month on the third series of tests of these steels which is being carried out in cooperation with the metallurgical laboratory of the Naval Gun Factory. 254 so-called "standard" tools have been heat treated. A carbon steel log showing 75,000 pounds per square inch tensile strength has been prepared and is ready for surface machining prior to testing, and in addition some work has been done on the preparation of three nickel steel test logs with tensile strengths of 75,000, 100,000, and 125,000 pounds per square inch. Further arrangements were made with several steel mills covering various alloy steel blooms to be worked up into test logs, and one of the seven blooms which are to be supplied has already been received. During the past month an examination was likewise made of the results of the "breakdown tests" carried out in the second high speed steel investigation, with the object of representing the results mathematically. It was found that the speed endurance curves for the four commercial types of high speed steels were very closely represented by a relatively simple equation having one constant. Furthermore this equation fits experimental results published by the Lathe Tools Research Committee of the Manchester Association of Engineers which are based upon tests made under entirely different conditions. These calculations and methods will be used in carrying out subsequent tests on the several alloyed steels.

2 Effect of Severe Cold Rolling of Metals

As has been previously pointed out in the Bulletin (73, Item 12; 74, Item 3; 76, Item 2), some rather striking and unexpected results have been obtained in connection with the Bureau's study of the effect of severe cold rolling on metals. In brief, it has been found that when a metal is deformed by cold rolling it becomes harder, but if the cold deformation is continued without any intermediate annealing, the hardening process continues up to a maximum, after which a reversal occurs and the metal becomes progressively softer. The microstructural changes are also indicative. During the hardening the identity of the crystals can be detected readily although they are distorted more and more by interior "slipping" within the crystals as the deformation increases. When all evidence of crystality as judged by the appearance under the microscope has disappeared, and the grains have been compressed into flat thin "scales", the hardening ceases and with still further deformation, softening occurs. The results so far obtained were presented at the recent meeting of the Advisory Committee on Non-Ferrous Alloys and were very well received and some excellent suggestions for additional work along this line were offered. Additional work now in progress will include a study of the possible directional properties of the rolled sheets, i.e., a determination of the hardness of the metal on sections perpendicular to the rolled surfaces as well as on the surface itself. The possible effect of the heat generated within the metal during the severe deformation and its relation to the hardening properties will also receive attention. The Bureau plans to study the structural atomic changes of the very severe rolled metals by means of the X-ray crystallographic method as soon as the necessary apparatus is available for use.

3 Uniform Classification of Iron and Steel Scrap

A conference was held at the Bureau of Standards on November 9 at which the adoption of a uniform master classification for iron and steel scrap was discussed. Representatives of many prominent industrial associations and government departments were present. The meeting was arranged by the Bureau as the result of opinions expressed by many interested groups that such a conference ought to be held. Mr. G. C. McClure of the National Association of Purchasing Agents, submitted for consideration a classification drawn up by a sub-committee of that Association. This classification includes six major divisions as follows: Specifications covering scrap for use in (1) Blast furnaces, (2) Basic open hearth furnaces, (3) Acid open hearth furnaces (this scrap being of low phosphorus and low sulphur content), (4) Electric furnaces, (5) Gray iron foundries, and (6) Bessemer converters. A seventh classification to include scrap for use in the manufacture of wrought iron was considered desirable.

It was the concensus of opinion that a national classification should cover the material when broken down ready for the furnace and should not go into details as to the various items composing the scrap. These details should be left to the purchaser's selection, according to his individual requirements. The discussion brought out the fact that much more work will be necessary before the classification can be finally agreed upon. This will be carried out largely through correspondence, the Bureau acting as a clearing house for the exchange of comment and criticism. The tentative classification will be published and circulated among those interested, and when finally agreed upon, will be submitted to the Bureau of Standards for indorsement as a national classification.

4. Meeting of the Advisory Committee on Non-Ferrous Metals

The regular autumn meeting of this Committee was held at the Bureau of Standards November 16. The large attendance and excellent discussion of the topics presented made the meeting one of more than usual interest. The discussion covered tentative and proposed specifications for non-ferrous metals and alloys, new standard samples, the effect of impurities on the mechanical properties of bearing metals, corrosion of non-ferrous metals, electrodeposition, the effect on hardness of the cold rolling of metals, aluminum casting alloys, the fatigue resisting properties of duralumin, investigation of alloys for dental use, the work of the Bureau on pure zinc in connection with the physical constants of metals, new refractories, moulding sand research, tests on the tensile properties of non-ferrous alloys at elevated temperature, mercury vapor poisoning in research work, and possible applications of metal spraying.

5 Meeting of the National Screw Thread Commission

A regular meeting of the National Screw Thread Commission was held at the Bureau of Standards November 14 and 15, the first day being devoted to subcommittee work and the second to a meeting of the full commission. Consideration was given to the topics listed in the following program: Report of subcommittee on taps and dies. Report of subcommittee on bolt heads, nuts and wrenches. Report of subcommittee on stud fits. Report of subcommittee on revision of progress report. Selection of symbol for lead to replace "P". Consideration of Sir Alfred Herbert's book, "Interchangeable Threaded Work." Report on relation between lead and angle errors. Cooperation of N.S.T.C. and Division of Simplified Practice on standardization of bolt heads, nuts and wrenches. Consideration of statement prepared by the American Screw Company with reference to stove bolts; also letter from Reed & Prince on the same subject. Consideration of letter with reference to the use of gauges to illustrate the various classes of fit.

6 Apparatus for the Study of the Corrodibility of Metals

Work which has been under way at the Bureau of Standards for some time on the corrodibility of metals has been previously referred to in the Bulletin. In the study of this property of metals, two general methods are available. The metal may be subjected to a combination of conditions which simulate the actual service to which it is to be subjected, or the metal may be subjected singly to the various influences, which combined, constitute the service environment. There is now available at the Bureau apparatus for a series of different tests as follows: (a) simple immersion within a corrosive medium, the temperature of which is accurately controlled; (b) repeated immersion in a corrosive medium followed by withdrawal into the atmosphere; (c) a modification of (b) which permits holding the specimen in the air for a period as long as one hour if desired which will allow thorough drying of the surface before it is reimmersed; and (d) exposure to a fine mist of the corrosive medium. Apparatus now being developed will permit the specimen to be subjected to a series of conditions successively, the whole cycle being comparable to the actual atmospheric conditions which the material has to withstand.

7 Improvement of Nickel Plating

The Research Advisory Committee of the American Electroplaters' Society met at the Bureau of Standards on November 16 and 17 and outlined a program of experiments to be carried out at the Bureau which, it is hoped, will lead to the development of the best process of nickel plating. The major portion of this research program calls for the plating of a large number of specimens of cold rolled steel as it is considered desirable to use the same material for all of these tests. A certain normal procedure has been adopted and will be used in some cases but many variations from these standard conditions will be carried out to determine the effect of these variations on the product. After plating the deposits will be examined both directly and under the microscope and they will be tested for hardness, for adhesion to steel under such adverse conditions as bending and rolling, and for their resistance to corrosion. Tests will likewise be made of nickel plating on brass and other metals to determine to what extent results obtained for steel are applicable in these cases.

A subject of special interest discussed at the meeting was that of the throwing power of different solutions, or the ability of the solution to deposit nickel on surfaces at different distances from the anode with a minimum of unevenness in distribution. It has been found that some solutions give a more uniform deposit than others. This results in a saving of time and material and a better product, because if the throwing power is poor, the parts of the object near the anode receive an excessive amount of nickel if a coating of adequate thickness is put on the more distant portions.

8 The Interference of Cobalt in the Bismuthate Method for Manganese

An article entitled "The Interference of Cobalt in the Bismuthate Method for Manganese," by G.E.F. Lundell, was published in Journal of the American Chemical Society, 45, 2600 (1923). A brief summary of this paper is given below. The proper conditions for the determination of manganese by the bismuthate method are reviewed and the interference of certain elements, notably cobalt, is discussed.

Cobalt is oxidized by bismuthate and the oxidized compound reacts with both ferrous sulphate and permanganate. The latter reaction does not start until some permanganate has been decomposed and then proceeds so rapidly that it causes low results for manganese.

In the presence of cobalt, Ford's method is to be preferred for accurate analyses and the persulphate-arsenite method for routine work.

9 The Determination of Titanium by Reduction with Zinc and Titration with Permanganate

"The Determination of Titanium by Reduction with Zinc and Titration with Permanganate," by G.E.F. Lundell and H.B. Knowles was published in Journal of the American Chemical Society, 45, 2620, (1923). The following briefly summarizes this paper. The reduction of titanium in a Jones reductor proceeds rapidly and is quantitative, provided the reduced solution is caught under a 3 - 5 fold excess of fine sulphate.

The reduction is conveniently carried on in solutions containing 3 - 5 percent by volume of sulphuric acid and may be done at any temperature between 25° and 100°.

Attention is called to interfering compounds and their removal, and to the ease with which titanous solutions can be prepared for volumetric use.

10 Silver Investigations

In addition to the varied and important commercial uses for silver, this metal has a unique value in the determination of fundamental constants of electrochemistry and the standard for the measurement of electric current. The Bureau of Standards therefore made an extended study (1908-1916) of the methods for depositing crystalline silver of the highest purity in the silver voltameter which by international agreement is the fundamental standard for determining the ampere. By using the voltameter in connection with an absolute current balance it has been possible to measure the absolute value for the electrochemical equivalent of silver. The value, 1.11800 milligrams per coulomb, resulting from the Bureau's measurements is in exact agreement with the international definition of this important constant.

By dividing the atomic weight of silver by the electrochemical equivalent, the value of the Faraday is obtained. This is the fundamental constant of electrochemistry for which the value 96 500 coulombs is recommended as a convenient round number which is within the limit of errors involved in the experiment.

The purity of the deposited silver is of great importance and it depends very largely on the purity of the solution from which it was deposited. It was estimated that the impurities in the best deposits amounted to .004% or the silver was 99.996% pure. The results of the Bureau's investigation were summarized in Scientific Paper No. 285 published some time ago and now out of print.

The more recent investigations on silver have been directed to the study of tarnishing and detarnishing of pure silver and some of its alloys. The Bureau began this work in 1917 and a paper on the Electrical Properties of Silver Sulphide, Scientific Paper No. 310 was published, after which the work was interrupted by the war.

Experiments on the tarnishing effect of gases and liquids were resumed in 1922. A satisfactory method was found for producing a standard of tarnish by which the effects produced on samples of various alloys can be compared. Sterling silver contains copper and was found to tarnish more readily than the pure silver. The rate of tarnishing increases as the amount of copper in the alloy is increased. Some alloys containing other base metals than copper have also been tested for their resistance to tarnish. Attention was given to the methods for detarnishing silver including a comparison of the electrolytic method with the use of abrasives and cyanide solutions. The causes of the formation of moss silver were found and some of its properties investigated.

A report of this work has been prepared and arrangements are now being made to publish it. Some additional experimental work in connection with this problem has been carried out since the previous announcement in the Technical News Bulletin of March 9, 1923, (No.71,Item 5)

11 Theory and Performance of Electrolytic Rectifiers

The demand for small rectifiers has grown during the last few years because of the increasing use of small portable storage batteries requiring low charging currents and also because of the increasing practice of charging larger batteries at low rates, known as "trickle charging." On account of this growing use and the general lack of information about the performance of such rectifiers the Bureau of Standards undertook a study of their comparative efficiencies under different conditions of service.

The characteristics of the electrolytic rectifier make it suitable for such purposes as the charging of batteries for radio sets, and this has resulted in the appearance of several different forms of the aluminum and tantalum rectifier.

The operation of the electrolytic rectifier was found to depend upon the electrical characteristics of the circuit as well as upon the rectifier itself. In order to explain the effect of the characteristics of the circuit upon the wave form of the rectified current as observed by the oscillograph, it was necessary to make a thorough study of the mathematical theory of rectification. The principal factors studied were the effect of inductance with and without iron cores, capacity of the rectifying electrode and the counter electromotive force of the battery being charged, as they affect the energy efficiency, power factor and the ratio of average current to the root mean square value as well as the wave form of the rectified current. Numerous oscillograms were made to show the effect of each of the factors. This material is being prepared for publication, but some additional experiments are necessary, and further announcement will be made when the paper is available.

12 A Study of Radio Signal Fading

When radio first began to be used for long distance communication, it was noticed that signals were not transmitted as far during the day as during the night time. It has also been observed that at night radio signals received from distant stations operating on the higher radio frequencies (shorter wave lengths) vary greatly in intensity from minute to minute. Persons who receive broadcast concerts from distant stations have occasion to notice this variation in intensity of received signals since loud signals may be received from a given distant station at one minute only to disappear entirely for a few minutes and then recover their original intensity.

This and related phenomena have been recorded from time to time and various hypotheses have been brought forward in an attempt to explain them. The phenomena are dependent upon a large number of variable quantities such as weather conditions, the nature of the country over which transmission occurs, the surroundings of the transmitting and receiving stations and the method of handling the receiving apparatus. Only by a statistical study in which the results obtained simultaneously at a large number of receiving stations are collected and tabulated, may reliable averages be obtained.

In an attempt to secure some worthwhile statistics of this kind, a cooperative study of radio signal fading was made by the Bureau of Standards and the American Radio Relay League during 1920 and 1921. In these tests from five to ten radio stations transmitted signals in succession on certain nights, according to prearranged schedules. The signals were received simultaneously by about one hundred receiving stations whose operators were provided with forms for recording the variation in the intensity of the signals as received. The results of this study are given in Scientific Paper, No. 476, "A study of Radio Signal Fading", which may be secured from the Superintendent of Documents at 10 cents per copy.

The paper includes summary tables pointing out possible relationships between weather conditions and the fading and intensity of radio signals and the prevalence of strays or atmospheric disturbances.

These tests indicate that the sources or causes of fading are intimately associated with the conditions at the Heaviside surface, which is a conducting surface about sixty miles above the earth. Daytime transmission is largely carried on by means of waves moving along the ground, while night transmission, especially for great distances and at high frequencies is by means of waves, transmitted along the Heaviside surface. Waves at night are thus free from the absorption encountered in the daytime but are subject to great variations caused by irregularities of the ionized air at or near the Heaviside surface.

13 Application of Statistical Analysis to Radio

One of the problems which has several times confronted the radio laboratory of the Bureau of Standards is the analysis of a large amount of complex data obtained in its investigations of radio transmission phenomena. The wide distribution of observers and the large number of variables contained in the data require the use of rapid methods of analysis. Using the tabulating machines of the Bureau of Census, it has been possible to make a comprehensive statistical analysis of such data with a minimum expenditure of time.

Several types of electric tabulating machines are in use all of which are designed to compile, classify and analyze statistical information. The original data are transferred to cards by means of punched holes which permit the machine electrically and automatically to classify and aggregate the various items recorded.

Three machines are used in this work, a key punch, a sorting machine, and a tabulating or counting machine. The key punch is manually operated and is used to transfer the data to the tabulating machine cards. The sorting

machine is used in sorting the information contained on the cards into any desired groups or classes and the tabulating machine counts the cards and at the same time obtains any total or subtotal of the information desired.

The first radio problem in which such an analysis was made by the Bureau was the investigation of signal fading conducted during 1920 and 1921 in cooperation with the American Radio Relay League. Another investigation which has been in progress since 1922 is the distance range tests on radio transmitting stations.

A mimeographed pamphlet which describes the methods used and gives examples of the method of analyzing the fading test data and the distance range test data has been prepared. This is Letter Circular 105 of the Bureau of Standards. A limited number of copies are available for distribution to those who can show that they have actual use for this. Requests should be addressed to the Bureau of Standards, Washington, D. C.

14 Announcement of Standard Frequency Transmissions

The Bureau of Standards is transmitting special signals of standard frequency about twice a month. The last previously announced schedule was published in Technical New Bulletin No. 77, Item 3. The next schedule is announced below. The signals can be heard and utilized in general east of the Mississippi river.

All transmissions are by unmodulated continuous-wave telegraphy. A complete frequency transmission includes a "general call," a "standard frequency signal," and "announcements." The "general call" is given at the beginning of the eight-minute period and continues for about two minutes. This includes a statement of the frequency. The "standard frequency signal" is a series of very long dashes with the call letters WWV intervening. This signal continues for about four minutes. The "announcements" are on the same frequency as the "standard frequency signal" just transmitted, and contain a statement of the measured frequency. An announcement of the next frequency to be transmitted is then given. There is then a four-minute interval while the transmitting set is adjusted for the next frequency.

The schedule of standard frequency signals is as follows:

Schedule of Frequencies in Kilocycles
(Approximate wave lengths in meters in parentheses)

Eastern standard time	Dec.5	Jan.7	Jan.21	Feb.5	Feb.20
11:00 to 11:08 PM	500 (600)	150 (2000)	500 (600)	1300 (231)	150 (2000)
11:12 to 11:20 PM	700 (428)	205 (1463)	600 (500)	1400 (214)	205 (1463)
11:24 to 11:32 PM	900 (333)	260 (1153)	700 (428)	1500 (200)	260 (1153)
11:36 to 11:44 PM	1100 (273)	315 (952)	833 (360)	1600 (187)	315 (952)
11:48 to 11:56 PM	1300 (231)	370 (810)	900 (333)	1700 (176)	370 (810)
12:00 to 12:08 AM	1500 (200)	435 (689)	1000 (300)	1800 (167)	435 (689)
12:12 to 12:20 AM	1600 (187)	500 (600)	1200 (250)	1900 (158)	500 (600)
12:24 to 12:32 AM	1700 (176)	570 (526)	1400 (214)	2000 (150)	570 (526)

15 Radio Signals of Standard Frequency

Item 1 of Technical News Bulletin 79 contained a list of radio transmitting stations which were maintaining, according to the Bureau's measurements, a frequency so close to that assigned to them by the Second National Radio Conference that their signals could be used as a means for checking wave meters and other apparatus. Further measurements have been made during the past month and the following is a revised list of stationswhich have attained the goal of varying not more than two kilocycles from their assigned frequency. There may be other stations maintaining their frequency with as great a degree of constancy as these but the ones listed are the only stations among those measured by the Bureau. Of course variations from these frequencies may occur in the future and, as pointed out in the last Bulletin, special apparatus is necessary for the maintenance of such a high degree of regularity. Those wishing to employ these transmissions in standardizing apparatus should consult Letter Circular 92, "Radio Signals of Standard Frequency and their Utilization", copies of which may be obtained by persons having actual use for them by application to the Bureau of Standards.

Station	Owner	Location	Assigned Frequency (kc)	Period covered by measurements	No. of times measured	Greatest deviation from assigned frequency	Average deviation from assigned frequency
WII	R.C.A.	New Brunswick, N.J.	17.04	Oct.1-Nov.24	35	.6%	0.3%
NSS	U.S.N.	Annapolis, Md.	17.48	Aug.24-Nov.15	48	.5%	0.2%
WQK	R.C.A.	Rocky Point, Long Island, N.Y.	18.21	" "	26	.4%	0.3%
WGG	R.C.A.	Tuckerton, No. 1, N.J.	18.85	" "	62	.4%	0.2%
WSO	R.C.A.	Marion, Mass.	25.80	" "	57	.7%	0.3%
WWJ	Detroit News	Detroit, Mich.	580	Aug.27-Nov.24	19	0.2%	0.1%
WCAP	Chesapeake & Potomac Tel.Co.	Washington, D.C.	640	Sept.11-Nov.24	23	.3%	.1%
WOS	Marketing Bureau	Jefferson City, Mo.	680	Sept.10-Nov.24	5	.2%	.0%
WSB	The Atlanta Journal	Atlanta, Ga.	700	Sept.14-Nov.24	21	.3%	.2%
WGY	Gen.Elec. Company	Schenectady, N.Y.	790	Oct.5-Nov.24	16	.3%	.1%
KDKA	Westinghouse Elec. & Mfg. Co.	Pittsburgh, Pa.	920	Nov.5-Nov.24	13	.2%	.1%

16 Revision of National Electrical Safety Code

The current edition of the National Electrical Safety Code is being revised according to the Rules of Procedure of the American Engineering Standards Committee. The revision of Part 2 dealing with underground and overhead line construction was started last year and is being handled by a large Sectional Committee and eight subcommittees. The same Sectional Committee will consider changes to Part 4.

The other parts of the Code, which deal with interior work and with grounding, will be handled by a separate Sectional Committee which is now being organized. Anyone having suggestions for change in these parts of the Code should submit them at once to the Bureau of Standards, Washington, D.C., for consideration.

17 Inaccurate Weights

The Mass Section of the Bureau of Standards was called upon during the past month to make reports covering certain weights which had shown serious changes in value with time. All of these weights are of the common screw knob type and this was undoubtedly an important element in causing the changes. One report covered two weights of platinum plated brass, similar to two others from the same maker which have been very constant for many years. Under the knobs of the inaccurate weights was a moist powder. It seems possible that a hygroscopic salt may have been produced by the action upon the lead adjusting material of some traces of the electroplating liquid which had been left under the knob. These weights had gained in about 14 years an amount nearly ten times the error allowable in the work for which they were used and nearly one-hundred times an amount readily detectable on balances often employed in the same laboratory. The second report dealt with two weights constructed of rather porous cast brass. One of them had a piece inserted in the bottom, probably for the purpose of removing some of the most porous metal. These weights, although lacquered on the outside surface, and though free from lead, had been continuously gaining in weight for over a year, after which one of them had later lost a considerable amount. A set of gold plated weights such as commonly used in analytical chemistry, was covered by the third report. Several weights in this set had gained from one to one and one-half milligrams in the past ten years, although such weights are intended for work carried to 1/100th of a milligram. In this case there had been both a slight tarnishing of the exterior gold plated surface and an oxidation of lead adjusting material. Such changes as these occur often enough to constitute a serious danger wherever weights of this kind are kept as reference standards. These weights should be checked for constancy at frequent intervals. Even intercomparison of such weights will be of great value since the changes in the various weights are likely to be different and it is not probable that they will be accurately proportional to the masses of the weights.

18 Cooperative Investigation of Clocks and Watches

The Bureau of Standards has completed arrangements with one of the clock manufacturers for a cooperative investigation of lever clocks. This company will furnish several clocks of different construction for the purpose of determining the effect of these variations on the rates of the clocks under different temperature conditions. Arrangements are also under way for the cooperative investigation of watches to determine the effect of the jewels on performance.

19 Factors Affecting the Resistance of Tank Block to Glass Attack

Probably one of the most annoying sources of trouble to manufacturers of commercial glass on a large scale is the lining of the glass melting tanks. Very frequently these linings fail through corrosion after 10 to 14 months service which results in a considerable loss of time and money. A life of 20 to 24 months for such a lining is not considered an unreasonable service to expect. Since the need for better tank refractories is so generally felt the Bureau has determined to conduct an investigation covering the various typical brands now used to determine, if possible, the relation between refractory composition, conditions of service and life. In order to get the investigation under way 27 small tanks have been made, using refractories which are typical of dense and open burned aluminous and silicious brands, as well as brands of medium composition. These will be subjected to the corrosive action of a soda-lime glass at high temperatures and the reactions obtained will be correlated, if possible, with the various types of refractories used.

20 A Study of the Factors Affecting the Life of Boiler Setting Refractories

The need has been felt for a long time of a better test covering the resistance of boiler setting refractories to slagging. Although the investigations which the Bureau has carried out on refractories for the development of specifications have shown that the service can be predicted with fair accuracy from the results of certain tests, it seems desirable to develop a laboratory slag test in order that factors of composition both of the slag and refractory and their comparative effect on the life of brick may be determined. The apparatus necessary for carrying out such a test has been designed and constructed and it is proposed to observe the effect of high, medium and low fusing clinker on various brands of refractories. Test panels of the brick to be investigated will be brought to a high temperature by means of a blast impinging on the brick. Finely ground and artificially prepared clinker will be introduced into the flame and in this way brought into contact with the test panel.

21 Water Proofing Materials

The exposure tests which the Bureau is carrying out on a number of proprietary and non-proprietary water proofing materials to determine their relative effectiveness and durability under actual weather conditions are still in progress. The first of these tests has now been under way for three years. It is hoped that a report of the results obtained at the end of two years exposure will soon be available as one of the publications of the Bureau. This paper will describe the results of over 4 000 absorption tests on treated specimens of lime stone and sand stone. In this investigation considerable attention was given to the effect of the materials on various textures of stone and also their effect on the natural appearance of the stone.

22 Investigation of Lifting Devices for Building Stone

The Bureau is undertaking an investigation of lifting devices used for hoisting large blocks of stone into place during the construction of buildings. The apparatus for making tests on full sized lifting devices is now completed and soon work will be started on several representative types. It is hoped that the results will give information concerning the relative capacity and safety of the various types of devices in common use.

23 Specifications for Upholstery Leather

The Bureau has recently completed physical tests on chrome tan grain and split upholstery leathers. The results show that these leathers have greater strength than vegetable tanned leathers and also greater resistance to tearing. These data together with results of chemical analyses on vegetable and chrome leathers have been issued as Letter Circular No. 106, entitled "Upholstery Leather II."

PUBLICATIONS OF THE BUREAU OF STANDARDS RELEASED DURING NOVEMBER

Scientific Papers

S 477 Spectroradiometric Analysis of Radio Signals. Chester Snow 10¢

Technologic Papers

T 240 Dynamometer Tests of Automobile Tires. W.L. Holt and P.L. Wormeley 10¢

T 241 A Comparison of the Deoxidation Effects of Titanium and Silicon on the Properties of Rail Steel. George K. Burgess and G. Willard Quick 10¢

Circulars

C 56 Standards for Electric Service, 2nd edition 60¢

Simplified Practice Recommendations

No. 4 Asphalt
No. 9 Woven-wire Fencing

Respectfully,
George K. Burgess, Director
HGB